

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte SHIRO ADAEDA, TATSUYA ANMA
and HIDEAKI TAKAHASHI

Appeal No. 2006-0859
Application No. 09/778,338

HEARD: July 11, 2006

Before HAIRSTON, RUGGIERO, and MACDONALD, Administrative Patent Judges.

MACDONALD, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-7 and 9-11. Claim 8 has been canceled.

Invention

Appellants' invention relates to a rotating machine having a plurality of permanent magnets and a plurality of armatures. The armatures are formed from lamination of a plurality of steel plates each having a thickness in the range of 0.25 to

0.65 mm. The plurality of steel plates are interlocked relative to each other by a series of partially punched openings. The magnetization angle of the pole of each of the plurality of permanent magnets is set with respect to the rotational axis to be in an electrical range of 120-140 degrees.

Claims 1, 2, and 7, are representative of the claimed invention and are reproduced as follows:

1. A rotating machine having a plurality of permanent magnets having alternating polarities in a circumferential direction at equally spaced intervals and a relatively rotatable associated element having a plurality of armatures around which coil windings are formed, the armatures are formed from a lamination of a plurality of electromagnetic steel plates each having a thickness in the range of 0.25 – 0.65mm.
2. A rotating machine as set forth in claim 1 wherein the electromagnetic steel plates are interlocked relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between.
7. A rotating machine as set forth in claim 1 wherein the spacing of the poles of said permanent magnets and their number and the number and spacing of the coils being set so that if the degree of rotation during which each coil experiences a complete cycle of electrical current is taken as 360° the circumferential extent of each of the magnet poles (the magnet electrical angle) lies in the range of 120° to 140° of such relative rotation.

References

The references relied on by the Examiner are as follows:

Neumann	4,469,970	Sep. 4, 1984
Yamamoto	5,338,996	Aug. 16, 1994
Miyao	4,737,674	Apr. 12, 1988
Uchiyama	5,767,601	Jun. 16, 1998
Nose	6,221,595	Apr. 3, 2001

The references cited by this Board are as follows:

Nakamura	4,618,377	Oct. 21, 1986
De Filippis	5,233,250	Aug. 3, 1993
Sakashita	5,677,587	Oct. 14, 1997
Takahashi	5,682,072	Oct. 28, 1997
Acquaviva	6,181,035	Jan. 30, 2001

Rejections At Issue

Claims 7 and 9-11 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 1, 3, 4, and 6, stand rejected under 35 U.S.C. § 103 as being obvious over the combination of Uchiyama and Neumann.

Claim 2 stands rejected under 35 U.S.C. § 103 as being obvious over the combination of Uchiyama, Neumann, and Yamamoto.

Claim 5 stands rejected under 35 U.S.C. § 103 as being obvious over the combination of Uchiyama, Neumann, Yamamoto, and Nose.

Claims 7 and 9-11 stand rejected under 35 U.S.C. § 103 as being obvious over the combination of Uchiyama, Neumann, and Miyao.

Throughout our opinion, we make references to the Appellants' briefs, and to the Examiner's Answer for the respective details thereof.¹

¹ Appellants filed a substitute appeal brief (the brief) on September 7, 2004, fully replacing the original appeal brief filed December 9, 2002. The Examiner mailed an Examiner's Answer (the answer) on June 2, 2005, fully replacing the original Examiner's Answer mailed March 12, 2003.

Findings of Fact

1. Appellants' specification does not contain drawings directed to the structure of Appellants' claims 7 and 9-11.
2. Appellants' specification does contain a drawing (Fig. 6) directed to the properties of Appellants' claims 7 and 9-11.
3. Appellants' figure 2 shows the relationship of the armature poles (31) on the stator (12) and the permanent magnets (22) in the rotating machine.
4. Fig. 2 shows twelve magnets of alternating polarity.
5. One rotation of the machine produces six complete alternating current cycles of 360 electrical degrees each.
6. Each pair of adjacent magnets generates one complete AC cycle of 360 electrical degrees, i.e., has an electrical angle of 360 degrees. Thus, each magnet has an electrical angle of 180 electrical degrees.
7. Each magnet physically occupies a mechanical angle of 30 degrees.
8. Each magnet has a magnetization angle between 0 and 30 mechanical degrees depending on how much of the center of the magnet is magnetized.
9. Each magnet has a magnetization angle between 0 and 180 electrical degrees depending on how much of the center of the magnet is magnetized.
10. Fig. 7 shows the properties of a rotating machine having twelve magnets based on the mechanical angle values in the first column. Column 1 of Fig. 7 compared to column 2 shows that one mechanical degree equal six electrical degrees, e.g. 135 in column 2 divided by 22.5 in column 1. Thus, each magnet (180 electrical degrees)

equals 30 mechanical degrees. 360 mechanical degrees divided by 30 yields twelve magnets.

11. Both ends of each magnet have an unmagnetized area. This fact is shown by Appellants' paragraph [00041]. The electrical angle of the magnetized portion of the magnet is subtracted from 180 degrees to yield the electrical angle of the unmagnetized portion of the magnet. The unmagnetized portions' electrical angle is then divided by two. Also, Fig. 7 shows that if column 2 is added to two times column 3, the result is always 180 electrical degrees for each magnet.

12. Each end's unmagnetized area occupies an electrical angle between 0 and 90 degrees (Column 3 of Fig. 7). Each unmagnetized area physically occupies a mechanical angle between 0 and 15 degrees.

13. Each magnet center's magnetized area occupies an electrical angle between 0 and 180 degrees (Column 2 of Fig. 7). Each magnetized area physically occupies a mechanical angle between 0 and 30 degrees.

14. Claim 7 recites that the electrical angle of each magnet pole lies in the range 120 to 140 degrees of the 180 electrical degrees occupied by the magnet.

15. Thus, claim 7 covers where the magnetized portion of the magnet occupies a minimum of $\frac{2}{3}$ (or $\frac{6}{9}$) of the 180 electrical degrees occupied by the magnet and a maximum $\frac{7}{9}$ of the 180 electrical degrees. The remainder of the 180 electrical degrees is unmagnetized.

16. Also, translated in terms of in terms of mechanical degrees where a magnet occupies X mechanical degrees, claim 7 covers where the magnetized portion of the magnet occupies a minimum of $\frac{2}{3}$ (or $\frac{6}{9}$) of the X mechanical degrees

occupied by the magnet and a maximum 7/9 of the X mechanical degrees. The remainder of the X mechanical degrees is unmagnetized.

OPINION

With full consideration being given to the subject matter on appeal, the Examiner's rejections and the arguments of the Appellants and the Examiner, for the reasons stated infra, we reverse the Examiner's rejection of claims 7 and 9-11 under 35 U.S.C. § 112; and we affirm the Examiner's rejection of claims 1-7 and 9-11 under 35 U.S.C. § 103.

Appellants have indicated that for purposes of this appeal the claims stand or fall together in eight groupings:

- Claim 1 as Group I;
- Claim 2 as Group II;
- Claims 3 and 4 as Group III;
- Claim 5 as Group IV;
- Claim 6 as Group V;
- Claim 7 as Group VI;
- Claims 9 and 10 as Group VII; and
- Claim 11 as Group VIII.

See page 4 of the brief. We will, thereby, consider Appellants' claims as standing or falling together in the eight groups noted above, and we will treat:

- Claim 3 as a representative claim of Group III; and
- Claim 9 as a representative claim of Group VII.

I. Whether the Rejection of Claims 7 and 9-11 Under 35 U.S.C. § 112 is proper?

It is our view, that the language of claim 7 does not contain the antecedent basis problems listed by the Examiner as these features are inherent to the claimed rotating machine and an artisan would recognize such.

Further, the language of the claim is not unclear to the point of being indefinite. Rather, Applicant has left unsaid a number of facts that would have greatly aided this Board (and apparently the Examiner) in more readily understanding the claimed invention. We list those facts at Findings 10-16 above. Since the Board was able to eventually deduce the structure being claimed, we are unable to say that an artisan would do less. Accordingly, we reverse.

However, should there be further prosecution, we recommend that the Examiner require Applicant to amend the specification to add further drawings showing the structural relationship recited in claim 7 (see figure 3 of De Filippis or figure 7b of Sakashita as examples) and detailed description to make explicit the information of Findings 10-16 above.

II. Whether the Rejection of Claim 1 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claim 1. Accordingly, we affirm.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie case of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). See also In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. Oetiker, 977 F.2d at 1445, 24 USPQ2d at 1444. See also Piasecki, 745 F.2d at 1472, 223 USPQ at 788.

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. “In reviewing the [E]xaminer’s decision on appeal, the Board must necessarily weigh all of the evidence and argument.” Oetiker, 977 F.2d at 1445, 24 USPQ2d at 1444. “[T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency’s conclusion.” In re Lee, 277 F.3d 1338, 1344, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002).

With respect to independent claim 1, Appellants argue at page 5 of the brief, “the [0.36-0.64mm] laminations in the Neumann reference are the laminations of the magnetic material ... and not [the armature laminations] around which the coil windings are formed.” Appellants then dispute the Examiner’s view that “the art recognizes that laminations [in this range] can be used for [either] permanent magnets or cores around which coils are wound” because Appellants contend that “the art does not indicate that

the optimal lamination thickness for one application would be the same for the other application.” Id. We find Appellants’ argument unpersuasive. Whether the thickness is optimal is not relevant. The issue before us is whether the prior art would have suggested the invention to one of ordinary skill in the art. There is no requirement that the prior art also suggest the invention is optimal.

Additionally, the Yamamoto reference (not applied in the rejection of claim 1) relied on by the Examiner to teach the “punched openings” of claim 2 describes such armature laminations being 0.5 mm (Col. 3, lines 50-51). This is the center of the range in the Neumann reference and further bolsters the Examiner’s position that the art recognizes that such laminations can be used for permanent magnets or cores around which coils are wound.

Therefore, we will sustain the Examiner’s rejection under 35 U.S.C. § 103.

III. Whether the Rejection of Claim 2 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claim 2. Accordingly, we affirm.

With respect to dependent claim 2, Appellants present no argument. Therefore, claim 2 stands or falls with claim 1 and we will sustain the Examiner’s rejection under 35 U.S.C. § 103.

IV. Whether the Rejection of Claims 3 and 4 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claims 3 and 4. Accordingly, we affirm.

With respect to dependent claim 3, Appellants repeat the argument of claim 1 with respect to the Neumann reference. We again find that argument unpersuasive for the reasons given above.

Therefore, we will sustain the Examiner's rejection under 35 U.S.C. § 103.

V. Whether the Rejection of Claim 5 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claim 5. Accordingly, we affirm.

With respect to dependent claim 5, Appellants argue at page 6 of the brief, that claim 5 is patentable because the feature of claim 5 would not be used in the device of the Neumann reference. We disagree.

The rejection before us used a combination of references of which the Neumann reference was used solely to teach the lamination thickness. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 426, 208 USPQ 871, 882 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986).

Therefore, we will sustain the Examiner's rejection under 35 U.S.C. § 103.

VI. Whether the Rejection of Claim 6 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claim 6. Accordingly, we affirm.

With respect to dependent claim 6, Appellants argue at page 6 of the brief, claim 6 is patentable because "the Examiner states that insulators are normally utilized" and "it is not true that there would be insulations employed in the laminations of the Neumann reference as the Examiner contends." We disagree. The rejection before us relies on the Uchiyama reference rather than the Neumann reference to teach the insulating layer feature. As noted above, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. We deem this is particularly true in the present appeal where the other reference was relied on to teach the claimed feature.

Therefore, we will sustain the Examiner's rejection under 35 U.S.C. § 103.

VII. Whether the Rejection of Claim 7 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claim 7. Accordingly, we affirm.

With respect to dependent claim 7, Appellants argue at page 7 of the brief, “[Miyao] does not show the use of magnets of the same circumferential extent nor does it disclose the arrangement where there is a nonmagnetic spacing between adjacent magnet poles.” We do not find this exact language in claim 7, however we find the following language in claim 1 from which claim 7 depends: “permanent magnets ... at equally spaced intervals.” We deem Appellants’ argument to be directed to this language. Since intervals is plural in claim 1, we interpret this language as requiring that each of the spacing of the magnets be equal from magnet to magnet around the entire circumference. We do not find this in the Miyao reference.

However, De Filippis (U.S. Patent 5,233,250) describes improving efficiency by using permanent magnets (corresponding to the claimed magnetic poles) having exactly the claimed magnetic angle of claim 7 in a motor with permanent magnets at equally spaced intervals (column 1, lines 9-13). The De Filippis reference throughout describes $\frac{2}{3}$ of a pole pitch (a pole pitch equals the X mechanical degrees of finding 16 above) which equals 120 electrical degrees and above (up to $\frac{1}{2}$ of the angular extent of the stator recess opening) as the optimum permanent magnet angular extent. We note that De Filippis’ unmagnetized portion is a gap rather than an unmagnetized portion of the magnet. However, claim 7 is silent as to this distinction, and even if claimed artisans would have known that both are equivalent.

Therefore, we will sustain the Examiner’s rejection under 35 U.S.C. § 103.

VIII. Whether the Rejection of Claims 9 and 10 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claims 9 and 10. Accordingly, we affirm.

With respect to dependent claim 9, Appellants refer back to the argument of claim 3 with respect to the Neumann reference. We again find that argument unpersuasive for the reasons given above.

Therefore, we will sustain the Examiner's rejection under 35 U.S.C. § 103.

IX. Whether the Rejection of Claim 11 Under 35 U.S.C. § 103 is proper?

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention as set forth in claim 11. Accordingly, we affirm.

With respect to dependent claim 11, Appellants refer back to the argument of claim 5 with respect to the Neumann reference. We again find that argument unpersuasive for the reasons given above.

Therefore, we will sustain the Examiner's rejection under 35 U.S.C. § 103.

Other Issues

The following references are considered to be information material to patentability of the present and any related patent applications.

We cite the De Filippis reference to show that it is known in the art to change a motor's characteristics by placing a gap between the permanent magnets such that the magnets each occupy 120 magnetic electrical degrees.

We cite the Nakamura reference to show that it is known in the art that "[t]o decrease the eddy current loss of electrical steel sheets, the sheet thickness is reduced and the sheets are provided with an insulating film on the surface thereof."

We cite the Sakashita, Takahashi, and Acquaviva references to show that it is known in the art to change a motor's characteristics by placing a gap between the permanent magnets (or by reducing the flux density between the poles).

Conclusion

In view of the foregoing discussion, we have not sustained the rejection under 35 U.S.C. § 112 of claims 7 and 9-11; and we have sustained the rejection under 35 U.S.C. § 103 of claims 1-7 and 9-11.

We designate that part of our affirmation (claims 7 and 9-11) which includes newly cited prior art as a new ground of rejection under 37 CFR § 41.50(b) (2005).

37 CFR § 41.50(b) provides that, "[a] new grounds of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 CFR § 41.50(b) also provides that the Appellant, **WITHIN TWO MONTHS FROM THE DATE OF THE DECISION**, must exercise one of the following two options with respect to the new grounds of rejection to avoid termination of proceedings as to the rejected claims:

- (1) Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner ...
- (2) Request that the proceeding be reheard under 37 CFR § 41.52 by the Board upon the same record ...

Should the Appellant elect to prosecute claims 7 and 9-11 further before the Primary Examiner pursuant to 37 CFR § 41.50 (b) (1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection of claims 1-6, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection of claims 1-6 is overcome.

If the Appellant elects further prosecution before the Examiner and further prosecution does not result in allowance of the application, abandonment or a second appeal, this application should be returned to the Board of Patent Appeals and Interferences for entry of a final decision with respect to the affirmed rejection of claims 1-6, including any action on any timely request for reconsideration thereof.

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No time period for taking any subsequent action in connection with this appeal
may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED

37 CFR § 41.50(b)

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Kenneth W. Hairston)	
Administrative Patent Judge)	
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Administrative Patent Judge)	APPEALS AND
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Allen R. MacDonald)	
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Appeal No. 2006-0859
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Notice of References Cited	Application/Control No. 09/778,338	Applicant(s)/Patent Under Reexamination Appeal No. 2006-0859	
	Examiner APJ MacDonald	Art Unit BPAI	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification	
	A	US-4,618,377	10-1986	Nakamura et al.	
	B	US-5,233,250	08-1993	De Filippis	
	C	US-5,677,587	10-1997	Sakashita et al.	
	D	US-5,682,072	10-1997	Takahashi	
	E	US-6,181,035	01-2001	Acquaviva	
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
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NON-PATENT DOCUMENTS

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)	
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
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